

### REMARKS

Applicant has reviewed and considered the Office Action mailed on April 10, 2007 and the references cited therein.

Claims 1, 5-7, 26, 34, and 37 are amended, claims 3-4 are canceled, and no claims are added. As a result, claims 1-2 and 5-39 are now pending in this application.

### 35 USC § 102 Rejection of the Claims

Claims 1, 2, and 15 were rejected under 35 USC § 102(b) as being anticipated by *Catreux et al.* (US Publication 2002/0183010).

“A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.” *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). “The identical invention must be shown in as complete detail as is contained in the ... claim.” *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989) (emphasis added).

Claim 1 is an independent claim directed to a wireless apparatus. More specifically, the wireless apparatus comprises: (a) an adaptive channelization controller to determine which of a plurality of predetermined sub-channels to use to support a multicarrier wireless link, based on channel state information; and (b) a receiver chain to process a received multicarrier signal associated with said multicarrier wireless link based on control information output by said adaptive channelization controller; wherein said receiver chain includes: a frequency demultiplexer to separate said received multicarrier signal into multiple signal portions based on frequency, said multiple signal portions corresponding to said plurality of predetermined sub-channels; and a plurality of Fourier transform units to separately process said multiple signal portions output by said frequency demultiplexer, said plurality of Fourier transform units including at least a first Fourier transform unit to process a first signal portion and a second Fourier transform unit to process a second signal portion.

Catreux et al. does not disclose a receiver chain that includes “a frequency demultiplexer to separate said received multicarrier signal into multiple signal portions based on frequency, said multiple signal portions corresponding to said plurality of predetermined sub-channels” and

“a plurality of Fourier transform units to separately process said multiple signal portions output by said frequency demultiplexer, said plurality of Fourier transform units including at least a first Fourier transform unit to process a first signal portion and a second Fourier transform unit to process a second signal portion.”

Based on the foregoing, it is submitted that claim 1, as amended, is not anticipated by Walton et al. Reconsideration and allowance of claim 1 is therefore respectfully requested.

Claims 2 and 15 are dependent claims that depend either directly or indirectly from independent claim 1. Consequently, these claims are allowable for at least the same reasons as claim 1.

Claims 18-20, 22-26, 29-33 and 37-39 were rejected under 35 USC § 102(e) as being anticipated by *Walton et al.* (US Patent 6,785,341).

Claim 18 is an independent claim directed to a wireless apparatus. More specifically, the wireless apparatus comprises: (a) a frequency demultiplexer to separate a received multicarrier signal into multiple portions based on frequency, said multiple portions corresponding to a plurality of predetermined frequency sub-channels and including at least a first portion and a second portion; (b) a first Fourier transform unit to convert said first portion of said multicarrier signal from a time domain representation to a frequency domain representation; and (c) a second Fourier transform unit to convert said second portion of said multicarrier signal from a time domain representation to a frequency domain representation, separately from said first portion of said multicarrier signal.

Walton et al. does not disclose “a frequency demultiplexer to separate a received multicarrier signal into multiple portions based on frequency, said multiple portions corresponding to a plurality of predetermined frequency sub-channels and including at least a first portion and a second portion,” “a first Fourier transform unit to convert said first portion of said multicarrier signal from a time domain representation to a frequency domain representation, and “a second Fourier transform unit to convert said second portion of said multicarrier signal from a time domain representation to a frequency domain representation, separately from said first portion of said multicarrier signal.”

The Examiner takes the position that Walton et al. discloses the above identified elements in column 7, line 46 to column 8, line 57 and column 15, lines 20-65. The Applicants

respectfully disagree. The identified passage in columns 7 and 8 of Walton et al. is describing a MIMO transmitter system and the passage in column 15 is describing a MIMO receiver system. The first and second Fourier transform units in claim 18 convert signal portions from a time domain representation to a frequency domain representation. The IFFTs in the MIMO transmitter system described in columns 7 and 8 of Walton et al., on the other hand, transform signals from a frequency domain representation to a time domain representation. Therefore, the passage in columns 7 and 8 is not relevant to this anticipation analysis.

In column 15, lines 42-46, Walton et al. indicates that each demodulator 154 in Fig. 5 includes an FFT processor that provides a stream of modulation symbol vectors. Each modulation symbol vector includes  $N_L$  modulation symbols for  $N_L$  frequency subchannels (column 15, lines 46-48). The modulation symbol vector streams from the FFT processors of all demodulators are provided to a demultiplexer which channelizes the stream from each FFT into a number of (up to  $N_L$ ) modulation symbol streams which may each be provided to a respective RX MIMO/data processor 156 (column 15, lines 46-48). Thus, Walton et al. first processes a received multicarrier signal in an FFT to convert it to a frequency domain representation. Then Walton et al. delivers the frequency domain representation (and frequency domain representations associated with other antennas) to a demultiplexer to divide it into streams associated with subchannels. In contrast, claim 18 includes a frequency demultiplexer to separate a received multicarrier signal into multiple portions based on frequency. A first Fourier transform unit converts a first portion of the signal to a frequency domain representation and a second Fourier transform unit converts a second portion of the signal to a frequency domain representation. This is a significantly different way to process the received signal.

Based on the foregoing, it is submitted that claim 18 is not anticipated by Walton et al. Reconsideration and allowance of claim 18 is therefore respectfully requested.

Claim 31 is an independent claim directed to a method comprising: (a) dividing a received multicarrier signal into a plurality of frequency sub-channel components; and (b) individually transforming each of said plurality of frequency sub-channel components from a time domain representation to a frequency domain representation.

Walton et al. does not disclose “dividing a received multicarrier signal into a plurality of frequency sub-channel components” or “individually transforming each of said plurality of

frequency sub-channel components from a time domain representation to a frequency domain representation.”

As described above in connection with claim 18, Walton et al. describes a system in which a received multicarrier signal is converted to a frequency domain representation in an FFT and is then demultiplexed to divide it into streams associated with subchannels. This is significantly different than dividing a received multicarrier signal into a plurality of frequency sub-channel components and then individually transforming each of the frequency sub-channel components from a time domain representation to a frequency domain representation.

Based on the foregoing, it is submitted that claim 31 is not anticipated by Walton et al. Reconsideration and allowance of claim 31 is therefore respectfully requested. A similar argument applies to independent claims 26 and 37 (as amended).

Claims 19-20 and 22-25, claims 29-30, claims 32-33, and claims 38-39 are dependent claims that depend either directly or indirectly from independent claims 18, 26, 31, and 37, respectively. Consequently, these claims are allowable for at least the same reasons as their corresponding base claims. These claims also provide further bases for patentability. For example, claim 32 adds to the method of claim 31, “converting said frequency domain representations resulting from individually transforming said plurality of frequency sub-channel components to a single serial stream based on control information received from an adaptive channelization controller.” As described previously, Walton et al. does not disclose individually transforming received signal portions to frequency domain representations and, therefore, it does not disclose converting such frequency domain representations to a single serial stream based on control information. Claim 33 further defines “individually transforming” of claim 31 to include “applying each of said plurality of frequency sub-channel components to a separate Fourier transform unit.” As described previously, Walton et al. does not disclose applying frequency sub-channel components to separate Fourier transform units to convert them to a frequency domain representation. The Examiner takes the position that Walton et al. teaches these limitations in Fig. 3 and in column 7 and 8. However, as discussed previously, Fig. 3 and columns 7 and 8 are discussing a transmitter and the IFFTs discussed therein transform signals to time domain representations, not frequency domain representations.

### **35 USC § 103 Rejection of the Claims**

Claims 3-4, 6 and 10 were rejected under 35 USC § 103(a) as being unpatentable over *Catreux et al.* (US Publication 2002/0183010) in view of *Walton et al.* (US Patent 6,785,341).

To establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). "All words in a claim must be considered in judging the patentability of that claim against the prior art." *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970). MPEP 2143.03

Claims 3 and 4 have been canceled without prejudice or disclaimer.

Claims 6 and 10 are dependent claims that depend either directly or indirectly from independent claim 1. Consequently, these claims are allowable for at least the same reasons as claim 1.

Claims 5, 7-9, 11, and 13-14 were rejected under 35 USC § 103(a) as being unpatentable over *Catreux et al.* (US Publication 2002/0183010) in view of *Walton et al.* (US Patent 6,785,341) further in view of *Hammerschmidt* (US Publication 2004/0151145).

Claims 5, 7-9, 11, and 13-14 are dependent claims that depend either directly or indirectly from independent claim 1. Consequently, these claims are allowable for at least the same reasons as claim 1. These claims also provide further bases for patentability. For example, claim 7 further defines the "receiver chain" of claim 1 as including "an adaptive parallel to serial converter to receive output streams from said plurality of Fourier transform units and to merge said output streams into a serial stream based on control information from said adaptive channelization controller." None of the references relied upon by the Examiner, either alone or in combination, disclose or suggest an adaptive parallel to serial converter to receive output streams from a plurality of Fourier transform units and to merge said output streams into a serial stream based on control information from an adaptive channelization controller. As noted by the Examiner, the parallel to serial converter (236) in *Hammerschmidt* receives output streams from one FFT 234 and converts them to a single stream. In addition, the parallel to serial converter (236) in *Hammerschmidt* is not adaptive and does not operate based on control information from an adaptive channelization controller. Claim 8 further defines the "adaptive parallel to serial converter" of claim 7 as ignoring "output streams that are associated with sub-channels that are

not currently used in support of said multicarrier wireless link.” The adaptive parallel to serial converter may use the control information from the adaptive channelization controller to determine which sub-channels are not currently used in support of the wireless link. None of the references relied upon by the Examiner, either alone or in combination, disclose or suggest such an adaptive parallel to serial converter. The parallel to serial converter (236) in Hammerschmidt is not adaptive in this manner.

Claim 9 further defines the “receiver chain” of claim 7 as including “an adaptive demapper to demap data within said serial stream output by said adaptive parallel to serial converter based on control information from said adaptive channelization controller.” None of the references relied upon by the Examiner, either alone or in combination, disclose or suggest an adaptive demapper to demap data based on control information from said adaptive channelization controller. The demappers identified by the Examiner in Hammerschmidt are not adaptive. Claim 11 further defines the “transmitter chain” of claim 10 as including “an adaptive serial to parallel converter to convert a serial stream output by said adaptive mapper to a parallel format based on control information from said adaptive channelization controller.” None of the references relied upon by the Examiner, either alone or in combination, disclose or suggest an adaptive serial to parallel converter to convert a serial stream to a parallel format based on control information from an adaptive channelization controller.

Claims 16-17 were rejected under 35 USC § 103(a) as being unpatentable over *Catreux et al.* (US Publication 2002/0183010) in view of *Hammerschmidt* (US Publication 2004/0151145).

Claims 16-17 are dependent claims that depend either directly or indirectly from independent claim 1. Consequently, these claims are allowable for at least the same reasons as claim 1.

Claim 21 was rejected under 35 USC § 103(a) as being unpatentable over *Walton et al.* (US Patent 6,785,341) further in view of *Hammerschmidt* (US Publication 2004/0151145).

Claim 21 is a dependent claim that depends directly from independent claim 18. Consequently, this claim is allowable for at least the same reasons as claim 18.

Claims 27-28 were rejected under 35 USC § 103(a) as being unpatentable over *Walton et al.* (US Patent 6,785,341) further in view of *Hammerschmidt* (US Publication 2004/0151145).

Claims 27-28 are dependent claims that depend directly from independent claim 26. Consequently, these claims are allowable for at least the same reasons as claim 26.

Claims 34-36 were rejected under 35 USC § 103(a) as being unpatentable over *Walton et al.* (US Patent 6,785,341) further in view of *Maltsev et al.* (US Publication 2004/0190637).

Independent claim 34 has been amended herein to further define the receiver chain as including “a frequency demultiplexer to separate said received multicarrier signal into multiple signal portions based on frequency, said multiple signal portions corresponding to said plurality of predetermined sub-channels” and “a plurality of Fourier transform units to separately process said multiple signal portions output by said frequency demultiplexer, said plurality of Fourier transform units including at least a first Fourier transform unit to process a first signal portion and a second Fourier transform unit to process a second signal portion.” Neither Walton et al. nor Maltsev et al., either alone or in combination, disclose or suggest these elements. As described previously, Walton et al. discloses a system in which a received multicarrier signal is converted to a frequency domain representation in an FFT and is then demultiplexed to divide it into streams associated with subchannels. This is significantly different from dividing a received multicarrier signal into a plurality of frequency sub-channel components and then individually transforming each of the frequency sub-channel components from a time domain representation to a frequency domain representation. Maltsev et al. was only cited to show the use of a dipole antenna.

**Allowable Subject Matter**

Claim 12 was objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. As it is believed that independent claim 1 is now in form for allowance, claim 12 has not been rewritten.

Conclusion

Applicant respectfully submits that the claims are in condition for allowance and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's attorney (480-948-3745) to facilitate prosecution of this application.

Respectfully submitted,

ALI S. SADRI ET AL.

By their Representatives,

**Customer Number: 45643**

480-948-3745

Date June 26, 2007

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**CERTIFICATE UNDER 37 CFR 1.8:** The undersigned hereby certifies that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail, in an envelope addressed to: Mail Stop Amendment, Commissioner of Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on this 26th day of June, 2007.

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